Appendix D. Initial Environmental Evaluation

Naknek Crossing Intermodal Economic Impact and Airport Use Study
Physical and Biological Environment Summary
Bristol Bay Borough

Prepared by Bristol Environmental and Engineering Corporation

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Summary

Crossing the Naknek River with a bridge and changing the status of airports in the Bristol Bay region will require an examination of the physical, biological, and human environment. Future actions, whether they are airport closures or change in operators, or bridge and road construction, will require action from the Federal Aviation Administration (FAA) for airports and the Federal Highway Administration (FHWA) at a minimum. As federal agencies, the FAA and FHWA are required to comply with the National Environmental Policy Act (NEPA) for all their proposed actions. The NEPA requires federal agencies to consider reasonable alternatives to their proposed action (including "no action") and evaluate the impacts to the human environment for each alternative. The human environment includes the physical (i.e., geology, soils, hydrology); biological (i.e., vegetation, wetlands, wildlife, fish); and human environment (i.e., socioeconomics, land use, noise, visual, subsistence).

An Environmental Assessment (EA) would need to be conducted for actions by the FAA or FHWA (or any other federal agencies that may be involved in the planning, funding, or construction of improvements). If impacts to the human environment are not considered to be significant, the project could move into final design and construction. If significant impacts are identified, an Environmental Impact Study (EIS) would need to be conducted. The EIS process is more detailed than the EA process and requires additional time.

This Appendix presents a summary of the physical, biological, and human environment within the Bristol Bay Borough. More in-depth and site-specific studies would need to be conducted throughout a bridge and access road planning and design process.

Geology and Soils

The Alaska Peninsula was produced by an island arc process. Frequent volcanic and seismic activity is caused by the subducting Pacific Plate and transform faults (i.e., Bruin Bay and Castle Mountain/Lake Clark). The surficial geology of the area is mainly composed of Quaternary age unconsolidated geomorphic deposits. The three main deposits are Quaternary alluvial, glacial moraine, and marine terrace deposits (Wilson et al., 1999). The area has undergone multiple glaciations, which dominate the landscape with till, moraine, glaciofluvial, and glaciolacustrine features.

Marine terraces and glacial outwash plains give the region gentle slopes with some hills of unconsolidated moraines. Alluvial and tidal processes have created cliffs and steep slopes near the banks of the main water channels. River outcrops and surficial geology are absent of bedrock in the project area (Muller, 1952). Soils are composed of glacial gravels, sand, silty sand, loess, volcanic ash, and clays. Some areas have shallow permafrost with areas of intense frost action.

The Soil Conservation Service performed a detailed soil study for the region. Soils were mapped as units depending on soil series, topographic slopes, and land types (Furbush et al., 1970). The study outlined five series of soils and two land types. The soils vary in drainage properties, texture, acidity, structure, and consistency. Some areas are well drained and are composed of volcanic ash, sand, and gravel. Others are poorly drained with an abundance of clay and thick peaty mats. Because mapped soil units can vary and occur as small patches within other units, detailed mapping must be conducted at site-specific locations.

Geology and soils would need to be studied for bridge and road construction, both from engineering and environmental aspects. Additional material sites would need to be found for transportation improvements at South Naknek. The soils in the area generally consist of gravelly glacial material covered with volcanic ash and often are topped by an excessively thick organic layer. Site-specific information would need to be gathered for each alternative considered.

Surface Hydrology and Floodplains

The Naknek River drainage area is approximately 3,700 square miles. The watershed includes seven interconnecting lakes. Naknek Lake collects runoff from the volcanoes and mountains to the east, west, and south. The 22-mile Naknek River drains Naknek Lake into Kvichak Bay. The Naknek River is tidally influenced from the mouth to King Salmon. The diurnal range (average difference between mean higher high water and mean lower low water) is 22.6 feet at the mouth and 3.2 feet near King Salmon (NCDC, 1988).

Many small streams and creeks feed into the Naknek River. The U.S. Geological Survey gauged Eskimo Creek (located near the King Salmon airport) from 1973-1984. During those years, daily stream flow averaged 0.5 to 150 cubic feet per second, with highs occurring during spring and fall, and lows occurring during mid-winter. Eskimo Creek and King Salmon Creek (located west of King Salmon) are listed as Tier II on the state impaired waterbody list. Tier II water bodies have had assessments completed and now require Total Maximum Daily Load limits (described according to Section 303(d) of the federal Clean Water Act) or waterbody recovery plans for development projects that may impact the water bodies.

The Naknek River was down-listed from Tier I to Tier III in 1998. Tier III is not 303(d) impaired, but has an implemented waterbody recovery plan. Water quality is tracked and monitored by the Alaska Department of Environmental Conservation (ADEC). Pollutants include petroleum hydrocarbons, toxics, and other substances entering the river from the King Salmon Air Base landfill and fuel storage sites. The U.S. Air Force, the ADEC, and the U.S. Environmental Protection Agency (EPA) continue remedial activities at the Air Base.

Road construction may disrupt surface water hydrology. Further study will be required to determine whether dewatering, or inundation of habitat, are potential impacts of the project. Another area of concern is whether changes in surface water hydrology will compromise soil stability of the road, and/or its underlying substrate or degradation of permafrost elsewhere in the project area.

The effects that a bridge would have on the Naknek River would need to be evaluated. Ice, tidal influences, navigation channels, and/or fish and wildlife migration may affect or be affected by a bridge. Water quality of surface waterbodies, including the Naknek River, will need to be evaluated. Runoff from the bridge deck will need to be evaluated to prevent storm water runoff from the bridge deck reaching the water. Potential sources of pollution, such as oil from vehicles, construction-related fuel storage and equipment fueling, de-icing compounds, and dust palliatives and their probable impacts need to be identified.

The U.S. Army Corps of Engineers defines flood plains as "lowlands adjoining the channel of a river, stream, or watercourse, or ocean, lake, or other body of standing water, which have been or may be inundated by flood water. The channel of a stream or watercourse is part of the flood plain." The Naknek River bed and the beds of its tributaries would be considered flood plains. Flood plains have not been mapped in the Bristol Bay region. Flooding has not been reported in King Salmon or South Naknek. Naknek is located on a bluff approximately 30 feet above mean sea level, so the flood hazard is low. However, structures located on lower banks may experience high water events. The highest known flood at Naknek occurred in 1917 and another coastal flood occurred in 1991 (USACE, 2004). Potential impacts to the Naknek River floodplain would need to be evaluated.

Geological and Physical Hazards

Geological and physical hazards in the Naknek River area include erosion, windstorms, flooding, earthquakes, volcanoes, permafrost, ice movement, and fog. The Naknek River flows through a high terrace and the steep banks consisting of unconsolidated silty sand are prone to erosion. Windstorms are rare, but damaging.

The Alaska Peninsula is located on the Pacific "Ring of Fire," a zone of frequent earthquakes and volcanic eruptions. Two major faults (Bruin Bay and Castle Mountain/Lake Clark) are located within 100 miles of the Bristol Bay Borough. However, earthquakes that do occur are at great depths and of low strength (BBB, 1993). Active volcanoes are located nearby, most notably Katmai and the "Valley of 10,000 Smokes."

The Naknek River area is located in a discontinuous permafrost zone. All structures and roads must be designed and built in a way that prevents or avoids subsidence from melting permafrost.

Ice in the Naknek River becomes safe for crossing around the end of November, with a thickness of more than 50 inches. Ice movement in the Naknek River is primarily due to tidal currents with wind speeding or slowing the movement (DMJM, 1983). Ice can move either upstream or downstream, depending on the wind and tide.

Mountains to the east, west, and south produce air currents that create a cloud cover in the Bristol Bay area. Air movements with high levels of moisture create low-level clouds that can cover the area with thick fog.

Climate

Temperature, precipitation, and wind data are collected at a weather station located at the King Salmon airport. Data are available dating back to 1941. The Bristol Bay Borough lies within a maritime climate influenced by the proximity of the Naknek River to the ocean. Seasonal temperatures are limited to a narrow range and vary from 42-63 degrees Fahrenheit (summer) and 29-44 degrees Fahrenheit (winter). Precipitation averages 19.4 inches annually, with the heaviest precipitation falling from July through October. Average snowfall is 45 inches, with an accumulation of 3 inches during January and February. Records kept since 1955 indicate a maximum extreme snow depth of 20 inches.

The annual wind speed at King Salmon averages 10.6 miles per hour. Extreme winds occur in the area with gusts reported to exceed 100 miles per hour. Naknek and South Naknek are near the open Kvichak Bay, and experience higher winds than does King Salmon. Aircraft, buildings, and the power line that connects from Naknek to South Naknek have been damaged by high winds. The Hydrological Climatologic Report for the Naknek River Crossing Feasibility Study (G.N. McDonald & Associates, 1980) reported the basic design wind at 30 feet above ground surface:

- 90 miles per hour recurrence interval: 25 years
- 95 miles per hour recurrence interval: 50 years
- 105 miles per hour recurrence interval: 100 years.

Air Quality

The Bristol Bay region is located in a Class II area according to ADEC regulations (18 AAC 50.015). Class II areas are “in attainment,” meaning air quality does not exceed the national ambient air quality standards. Summer season fugitive dust is common in rural Alaska communities, in part due to unpaved roads and the lack of or disturbance to ground cover. Unconsolidated material along the Naknek River bed adds to airborne particulates.

Windblown particulate matter increases during wind events and times of low precipitation and humidity.

The construction phase of the project would introduce additional air pollutants in the area. These may be attributed to operation of heavy equipment exhaust and particulates. Dust from material mining, hauling, and placement would need to be examined. Further investigation will be needed regarding the levels of airborne particulates and whether an additional gravel road will add to air quality problems.

Vegetation

Dominant vegetation in the Bristol Bay area is tundra, consisting of sedges, mosses, dwarf birch, Labrador tea, and various shrubs, forbs, and grasses over poorly drained peat. Permafrost occurs throughout the area. On knolls, sand dunes, and terraces, vegetation may consist of sparsely vegetated white spruce, alder, shrubs, lichens, and mosses over well-drained sandy soils.

Wetlands

All five wetland systems (as described by Cowardin et al., 1979) occur in the Bristol Bay area: Marine, Estuarine, Riverine, Lacustrine, and Palustrine. Marine Systems consist of deepwater habitats exposed to waves and currents of the open ocean. Estuarine Systems consist of deepwater tidal habitats and adjacent tidal wetlands that are occasionally diluted by freshwater runoff. Riverine Systems consist of wetlands and deepwater habitats contained in a channel with flowing water. Lacustrine Systems include wetlands and deepwater habitats associated with lakes and ponds. Palustrine systems include non-tidal vegetated wetlands bounded by uplands or any other System.

Wetlands functions throughout the region include anadromous fish habitat, flood control, nutrient export, waterfowl and wildlife habitat, water quality maintenance, shoreline stabilization, sediment retention, and groundwater recharge. Wetlands functions and values throughout the region range from low to moderate to high, depending on their location.

Wetlands dominate the region, and wetlands will need to be filled to construct a road, or for any airport or road improvements. Complete wetland avoidance is not possible. Wetlands in the project area will need to be mapped to quantify the types and amounts that could potentially be impacted under different development scenarios/options. The analysis should also determine whether development in wetlands potentially creates any significant impacts to surface water hydrology or fish and wildlife habitat in the project area. Sedimentation from disturbed soils will need to be investigated. State and federal wildlife management

agencies and the Natural Resources Conservation Service would be consulted throughout the project.

Fish and Wildlife

The Naknek River is important habitat for five species of Pacific salmon migrating through the river to Naknek Lake and its tributaries. The Naknek River system is a primary spawning area, especially for sockeye salmon. Salmon migrate from mid-June to late August. Freshwater fish species include rainbow trout, Arctic grayling, arctic char, lake trout, whitefish, burbot, northern pike, sculpin, stickleback, blackfish, herring, Dolly Varden, and smelt (eulachon).

Thousands of migratory waterfowl stop to feed and rest on the Naknek River and adjacent wetlands. The U.S. Fish and Wildlife Service (USFWS) has been conducting annual spring staging studies along the Naknek River since 1986 (Kirk, 1999). Annual surveys have continued since 1999 and results will be reported in the near future (USFWS, 2003, personal communication). Approximately 25 species of dabbling and diving ducks, geese, and swans are seen in the area each spring. Waterfowl arrive from March through May, with peak observations generally occurring in late April. Species abundance varies considerably from year to year. Waterfowl (including whistling swans) concentrate upriver from King Salmon during the fall migration (BBB, 1993).

Bald eagles use the Naknek River and adjacent habitat to fish, hunt, and nest. Other raptors that occur in the region include peregrine falcons, ospreys, golden eagles, gyrfalcons, and rough-legged hawks.

Shorebirds use the same habitats and flyways as migratory waterfowl. Other bird species include the short-eared owl, sparrow, Lapland longspur, gray jay, chickadee, crossbill, swallow, dipper, wren, yellow warbler, common redpoll, snow bunting, rosy finch, ptarmigan, and grouse. (Selkregg, 1976).

Mammal species that occur throughout the region include common and tundra shrew, beaver, Northern bog lemming, snowshoe and arctic hare, muskrat, mink, marten, land and river otter, arctic fox, wolf (in low numbers), wolverine, lynx, moose, brown/grizzly bear, and caribou. (Selkregg, 1976). The Alaska Peninsula caribou herd ranges between wintering grounds along the south banks of the Naknek River to calving grounds south of Port Heiden.

Marine mammal species that are known occur in Bristol Bay are whales (beluga, gray, and orca), harbor porpoise, walrus, northern fur seal, harbor seal, Steller sea lion, and sea otter. Beluga whales are known to follow smelt when they migrate up the Naknek River.

The effects of all the scenarios and options would require consultation with the Office of Habitat Management and Permitting, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and Alaska Coastal Zone officials.

Threatened or Endangered Species

Endangered and threatened species of Alaska include: Aleutian shield fern, short-tailed albatross, spectacled eider, Steller's eider, Eskimo curlew, Steller sea lion, humpback whale, right whale, blue whale, and bowhead whale. Of these, the spectacled and Steller's eider are known to occur in the area. Essential fish habitat occurs along the Naknek River and its tributaries.

Consultation with the USFWS and National Marine Fisheries Service (NMFS) for the Naknek and King Salmon Airport Master Plans (ADOT&PF, 2001a and 2001b) indicated that the airport projects would not likely affect any threatened or endangered species or their habitat. The NMFS and the USFWS would be consulted throughout this study.

Hazardous Materials

Phase I Environmental Site Assessments have been conducted at the airports during the airport master planning phases. A Phase I Environmental Site Assessment will need to be conducted for the road and bridge options/scenarios. If contamination were encountered, further testing would be needed to determine the nature and extent of the contamination.

Subsistence

The undeveloped lands on the south side of the Naknek River are used for subsistence hunting and gathering. A bridge and road would provide increased access to subsistence areas. The majority of the land surrounding South Naknek is owned by the local Native Corporation, the Alaska Peninsula Corporation. The general public currently needs permission to enter corporate lands. During the detailed study phase of the project, an assessment of subsistence resource impacts due to increased access would need to be conducted. Additional restrictions or enforcement activities may be necessary to maintain adequate subsistence resources.

Cultural and Archaeological Resources

The Naknek area was first settled more than 6,000 years ago by Yupik Eskimo and Athabascan Indians. The area has historically been used for fish camps, hunting, and trapping. Cultural Resources Surveys have been conducted for the airports. During the detailed study phase, a Cultural Resources Survey would need to be conducted for road and bridge routes.

Parklands and Recreational Areas

The U.S. Department of Transportation Section 4(f) lands are publicly owned lands in public parks, recreation areas, wildlife and waterfowl refuges, and historic sites. Taking Section 4(f) lands is not permitted by U.S. Department of Transportation projects, unless no alternative exists. Most of the land surrounding Naknek, King Salmon, and South Naknek is local Native corporation land (Paug-vik, Inc. and Alaska Peninsula Corporation), Bristol Bay Borough, municipal lands, private land, and Native allotments. Publicly owned parklands and recreational areas are not sited in the Naknek area. To ensure avoidance of 4(f) lands, land status and land use designations would need to be confirmed before siting a bridge or road routes.

Noise

Aircraft noise is reduced when an airport closes. An increase in vehicular noise would be expected in an area where a new road is built. Reductions and increases in noise due to any proposed action would need to be considered during a more detailed study. The effects of noise during construction of a bridge at any location over the Naknek River would need to be examined. Noise effects due to road or airport construction would need to be evaluated.

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